Emergence Time and Sequence of Primary Teeth in a Sample of Nepalese Children

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ABSTRACT

Background

Primary teeth emergence is an important milestone in children and timing of emergence varies among populations.

Objective

To determine the emergence time and sequence of primary teeth in a sample of Nepalese children visiting Dhulikhel Hospital.

Method

A descriptive cross-sectional study was conducted in children of 5 months to 4 years visiting Dhulikhel Hospital. The emergence of incisal tip to incisal margin for incisors and canines, cusp tip to occlusal margin of molars visible were recorded along with age in months and gender. Descriptive statistics was done to calculate the mean age of emergence of each tooth with standard deviation. Unpaired t-test was used to assess the difference between the mean age of emergence of teeth between right and left sides and between boys and girls.

Result

The first teeth to emerge was mandibular central incisor at the age of 9.37 ± 1.42 months and the last one was maxillary second molar at the age of 32.91 ± 6.39 months. There was no significant difference in the mean emergence time between the maxillary and mandibular jaws, between right and left sides of jaws and between boys and girls except for primary maxillary right central incisor and mandibular right second molar which was found to be emerged early in girls.

Conclusion

The emergence time and sequence of primary teeth observed in the present study can be used as a baseline data for the children of Kavre district.

KEY WORDS

Emergence, Eruption, Nepalese children, Primary teeth

INTRODUCTION

Tooth emergence is the appearance of any visible part of the tooth in oral cavity through gingiva.[1] It is supposed to be an important event in one's life and parents are often worried about the timing of teeth emergence. The timing of emergence of teeth has been found to vary among various populations.[2,3]

There are only a few researches done on emergence of primary teeth in Nepal. These studies have shown delayed emergence time as compared to western countries.[4-6] Population based data is needed for the emergence time and sequence of primary teeth. A study conducted in children of Kavre district demonstrated delayed eruption of permanent teeth.[7] The eruption time of first primary tooth has been found to have correlation with the time of first permanent tooth and teeth emergence also may follow secular trends.[8,9] This study was conducted with the objective to determine the emergence time and sequence of primary teeth in a sample of Nepalese children visiting Dhulikhel Hospital.

METHODS

A descriptive cross-sectional study was conducted in children of age 5 months to 4 years visiting Dhulikhel hospital. Ethical approval for research was obtained prior from Institutional Review Committee, Kathmandu University School of Medical Sciences (Ref. 137/18). The time period of the study was from October 2018 to December 2019. Sample size was calculated based on the mean difference of eruption between male and female as described by Anita et al.[5]

The formula used for calculation was

$n1= (\sigma1^2 + \sigma2^2 / \kappa) (z1-\alpha/2 + z1-\beta)^2/ \Delta^2$

$n2 = (\kappa^* \sigma1^2 + \sigma2^2) (z1-\alpha/2 + z1-\beta)^2/ \Delta^2$

n1= sample size for group 1 (males)

n2= sample size for group 2 (females)

σ1= standard deviation of group 1

σ2= standard deviation of group 2

Δ = difference in group means

Κ=n1/n2

z1-α/2= two-sided Z value (Z= 1.96 for 95% confidence interval)

z1-β =power

The sample size was calculated to be 228. The present study was done in 240 children. The sampling method was purposive sampling. Children visiting Pediatrics and Pediatric Dentistry out patient department during the study period were included in the research. The inclusion criteria for sample selection were: healthy children of age 5 months to 4 years, children from Kavre district, and whose parents gave informed consent. Exclusion criteria were: children with growth related disorder, any congenital or genetic abnormalities, syndromes, and any systemic disease that affected eruption of teeth.

The date of birth of children was recorded and based on that age of children was calculated in months. Oral examination was done with mouth mirror and probe under torchlight in Pediatrics outpatient department whereas under dental chair with good illumination of light in Pediatric Dentistry department. The emergence of incisal tip to incisal margin for incisors and canines, cusp tip to occlusal margin of molars visible were recorded. Data was collected by two investigators; a pediatric dentist and a dental surgeon. The dental surgeon was trained for recording the data. The two examiners were calibrated in a sample of 20 children and the inter examiner consistency was 100%.

The data were entered and analysed using IBM Statistical Package of Social Sciences (SPSS) Statistics for Windows, version 25 (IBM Corp., Armonk, N.Y., USA). Descriptive statistics was done to calculate the mean age of emergence of each tooth with standard deviation. Unpaired t- test was used to assess the difference between the mean age of emergence of teeth between right and left sides of jaw, between maxillary and mandibular teeth and between boys and girls. The level of significance was kept at 0.05.

RESULTS

The study consisted of 302 children of age 5 months to 4 years. Among those only the children with emerged teeth were recorded. So, the total number of children studied were 240 among which 136 (56.7%) were males and 104 (43.3%) females. There was no significant difference in the mean age of emergence of teeth between right and left sides so only the right side was selected and presented in table 1. The first teeth to emerge was mandibular central incisor and the last was maxillary second molar. Though non-significant, maxillary lateral incisor, first molar and canine were emerged earlier in maxilla than mandible (Table 1).

Table 1. Mean age (months) of emergence of primary teeth

Teeth	Maxillary (Mean ± SD)	Mandibular (Mean ± SD)	p value
Central Incisor	9.95 ± 1.19	9.37 ± 1.42	0.822
Lateral Incisor	13.37 ± 1.54	14.50 ± 1.36	0.595
Canine	20.55 ± 3.00	21.58 ± 2.34	0.994
First Molar	18.77 ± 5.36	19.31 ± 2.18	0.368
Second Molar	32.91 ± 6.39	30.89 ± 5.65	0.493

*Significant ($p < 0.05$)

There was no significant difference in the mean age of emergence of teeth between boys and girls except for primary maxillary right central incisor and mandibular right second molar which was found to be emerged early in girls (Table 2, 3).

Table 2. Mean age (months) of emergence of primary maxillary teeth in boys and girls

Teeth	Gender	N	Age in months ± SD	p value
Central Incisor	Boys	13	10.38 ± 0.96	0.022*
	Girls	7	9.14 ± 1.21	
Lateral Incisor	Male	10	13.50 ± 1.58	0.691
	Female	6	13.17 ± 1.60	
Canine	Male	9	20.22 ± 3.23	0.671
	Female	11	20.82 ± 2.92	
First Molar	Male	15	18.80 ± 5.87	0.973
	Female	7	18.71 ± 4.64	
Second Molar	Male	14	33.71 ± 6.40	0.448
	Female	8	31.50 ± 6.54	

*Significant ($p < 0.05$)

Table 3. Mean age (months) of emergence of primary mandibular teeth in boys and girls

Teeth	Gender	N	Age in months± SD	p-value
Central Incisor	Male	13	9.62 ± 1.12	0.413
	Female	7	9.18 ± 1.62	
Lateral Incisor	Male	9	14.89 ± 1.26	0.207
	Female	7	14.00 ± 1.41	
Canine	Male	10	20.50 ± 1.71	0.069
	Female	9	20.56 ± 2.60	
First Molar	Male	9	19.33 ± 2.00	0.967
	Female	7	19.29 ± 2.56	
Second Molar	Male	13	32.69 ± 5.69	0.014*
	Female	6	27 ± 3.28	

*Significant ($p < 0.05$)

DISCUSSION

Eruption of teeth is a physiological process by which a tooth moves from its site of development to its final functional position in oral cavity. The process of eruption of teeth consists of five stages, one of which is the emergence of any visible part of tooth into oral cavity.[1]

The knowledge of emergence timings and sequence of primary teeth is important for diagnosis of developmental disturbances and anomalies, treatment planning, conducting preventive programs for dental caries, anthropological purpose and also has legal and forensic applications. The phase of emergence of teeth is also associated with "teething" which consists of various local symptoms; pain, gingival itching, drooling of saliva and systemic symptoms; fever, bowel upset, irritability and the parents are often worried about the condition of their children.

The age of eruption of primary teeth given by Logan and Kronfeld in 1933, modified by Schour and Massler in 1941 and Lunt and law in 1974 has been in use as standards worldwide.[10-12]

These classical studies show eruption sequence of primary teeth as central incisor, lateral incisor, first molar, canine and second molar. The present study also has the similar findings. The study by Logan and Kronfeld demonstrated mandibular teeth eruption ahead of maxillary teeth whereas the present study demonstrated that lateral incisor, first molar and canine were erupted earlier in maxilla though not significant. This finding is similar to the one suggested by Lunt and law which was a review of literature on the eruption of deciduous teeth done for revision of Logan and Kronfeld table.[12]

In the present study, there was no significant difference in the emergence time of teeth between right and left side so only right side was selected. Woodroffe et al. also suggested that there is no any hard and fast rule on right or left teeth emergence and is kind of symmetrical.[13]

There are a few researches done in Nepalese children in the past decade.[4,5] Baral et al. studied the eruption chronology of primary teeth in the eastern, middle, western, midwestern and far western region of Nepal. Five hundred children from major 15 castes residing in mountain, hilly and terai region of the country were included.[4] Gupta et al. did research of emergence of teeth in 501 subjects of age 3 months to 60 months in Sunsari district of Nepal.[5] Both of these researches on Nepalese children demonstrated delayed eruption of primary teeth compared to western population. In the present study also, there was delayed teeth emergence. At the age of one year, most of the children had only four primary incisors erupted; maxillary and mandibular central incisors and at the age of around 33 months most of the children had primary dentition completed.

Teeth eruption may have possible secular trends as the timing of emergence of teeth accelerates over the years in the same population.[9] With this interest, the present study was conducted in a sample of children from Nepal.

In comparison to the study done by Baral et al. the emergence time of primary teeth in the present study sample is early whereas, in comparison to the one done by Gupta et al. the emergence time of all the primary teeth is delayed except for maxillary and mandibular central incisors.[4,5]

Both of these researches done in Nepal also showed early emergence in girls as compared to boys. In contrast to this, in the present study, only the maxillary central incisor and mandibular second molar emerged early in girls. In longitudinal research done by Holman et al. in Japanese children and in a cross-sectional study done by Rao et al.

in children of Mangalore, India, there was no significant difference in the emergence time between boys and girls.[14,15]

The sample of children in this research were all from different places of Kavre district so the data may be considered as a baseline for the population of children in Kavre district and have clinical significance for diagnosis and treatment planning purpose.

Though the gestation ages of teeth development are usually consistent, the emergence time of primary teeth differs significantly among individuals.[16] And this difference may be due to genetic, nutritional factors socioeconomic factors, endocrine factors, race and ethnic groups.[17-20] This research did not look upon these factors so this may be the limitation of the research. Further research in the future has to be carried out with the considerations of various factors affecting emergence of teeth in different regions of Kavre district.

CONCLUSION

The first primary teeth to emerge was mandibular central incisor at the age of 9.37 ± 1.42 months and the last one was maxillary second molar at the age of 32.91 ± 6.39 months. There was no significant difference between boys and girls in teeth emergence time except for maxillary right central incisor and mandibular right second molar. The result of the study can be used as a baseline data for the primary teeth emergence in children of Kavre district.

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